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V.—PHONETIC TENDENCIES IN THE INDO-EUROPEAN CONSONANT SYSTEM.

1. Since the seventies of the last century, the hypothesis of phonetic laws has won general recognition; occasional opposition (Wheeler, Bremer, Herzog, etc.) is directed rather against loose definitions of these laws, or their universal extension, than against their basic assumption. Their psychological reasons have been explained in various ways (Paul, Wheeler, Oertel, Wundt, Delbrück, Bremer, Herzog), but the general gist of practically all explanations may be concentrated in Sievers' statement (Phon. 4, 243): "Aller lautwechsel beruht auf mangelhafter reproduktion der traditionellen aussprache".

The physiological factors, however, which necessitated phonetic changes, have hitherto received but little attention. It is generally assumed with great probability—though hardly proved—that there exist no important differences between the organs of speech of different individuals or linguistic groups, although minor differences are occasionally admitted (Bremer, Deutsche Phonetik, p. 11).

2. At the same time, even the most untrained ear can perceive without difficulty that any given language has a well-defined phonetic character which can easily be imagined to have had a decisive influence upon phonetic changes. We are hardly able at present to understand the psychological reasons of this phonetic habitus of languages, but our present stock of phonetic formulas seems sufficient to permit the description of linguistic characteristics in three respects: As to the actual occurrence of certain sounds in certain languages—as to their direction of development—and as to the physiological tendencies expressed by these currents. In other words: it seems that the time has come to give phonetic sketches of languages from a comparative standpoint, thus systematically grouping our present knowledge of apparently isolated phonetic laws.

Not the slightest attempt even at an approach to completeness is contemplated in this brief article. It is rather intended as a tentative program, a suggestion of investigations that might be made along these lines, adding only meagre instances of a few especially clear phonetic tendencies. More detailed analyses of individual problems have been attempted by the writer in two articles which will appear in the near future (Die Stabilität des germanischen Konsonantensystems, I. F., and Forchhammers Akzenttheorie und die germanische Lautverschiebung, JEGPh).

3. The Indo-European consonant system, to which this paper is limited, shows a fairly wide range of places of articulation, tending rather toward front articulation, at least in comparison with the Semitic languages, as it lacks only the larynx and the pharynx articulations. Surprising is the Indo-European lack of spirants: The primitive Indo-European language possesses practically only the dental spirant *s*; voiced *z* occurs through assimilation, and similarly *i̯* and *u̯* can become real spirants only through combinatory sound changes; the existence of þ has not been demonstrated in a convincing manner. The occurrence of three complete series of "gutturals" is peculiar and not paralleled in living Indo-European languages, but may be interpreted as a phonetic interpolation between older, simpler conditions, and the beginning separation of the primitive language into the dialects. This leaves aside the question of the assimilation of the so-called palatals, for which compare Hirt, KZ. 24, 226 ff., Hermann, KZ, 41, 59, Delbrück, Einleitung^4, 124.

4. In the historical development of the Indo-European languages, two facts become clearly apparent at first glance: in the eastern, western and (partly) southern Indo-European languages, a tendency toward a suppression of the two extreme places of articulation, the labial and the velar, and a preference for palatal and dental articulations; on the other hand, in the central and northern part of the Indo-European territory, a very conservative adherence to the labial and velar articulations, however without any loss of dental articulations. E. g., Armenian and Celtic lose, partly or entirely, the *p* sound. All eastern languages, including Albanese, abandon the labial element of the labiovelars, while in Greek and Celtic there is at least a considerable trace of the same tendency, and the Romance languages show similar inclinations especially on Celtic territory (compare French *quatre*).

Without citing isolated details (like Latin þ > *f*) it can be stated that changes of the place of articulation are frequent everywhere except on Germanic territory, where they occur only as results of assimilation or dissimilation (like Goth. *þliuhan*—German *fliehen*).

5. Next to changes of the *place* of articulation, comparative phonology takes account of changes of the *mode* of articulation, which comprises differences between voiced and voiceless consonants, and between stops and spirants, as e. g. *d* > *t*, *t* > þ or *t* > *ts* or *ss*. But in considering the geographical and ethnic distribution of such changes, a further discrimination between spirants (at least of the dental and palatal series) seems imperative: spirants of these places of articulation can be formed in two ways: either, the surface of the tongue is convex, so that the breath passes through a narrow slit, as with þ, χ; or, the tongue forms a more or less distinct rill in its median line, as with *s*, *sh*. The former may be called slit sounds, the latter rill[1] sounds. This is not a minor distinction, but one which influences the phonetic character of a language more than any other consonant change in Indo-European languages. Accordingly, it may be well to distinguish the changes of the mode of articulation into such affecting the *way* of articulation (the conditions of voice and voicelessness, occlusion and narrowing), and such affecting the *shape* of articulation, or, more accurately, the shape of the articulating organ of speech, according to slit or rill shape.

6. With respect to this distinction, the Indo-European languages show a surprising regularity of development, which I have outlined approximately in the following way in my article on the stability of the Germanic Consonant system:

The tendency to substitute rill spirants for velar, palatal, or dental stops, or for slit spirants, appears in all Indo-European languages with the exception of the Germanic group. The time and frequency of its appearance is in direct proportion to the geographical and chronological remoteness of a given language from the Germanic group. In all *satem*-languages it is fully developed in the very earliest documents that we possess; only Albanese, Lithuanian, and Sanscrit show conservative traces of adherence to the older articulation—the former possibly in consequence of their close proximity to *centum*-languages, the latter perhaps on account of the strict separation of the Indo-European and the non-Indo-European ethnic elements in India. Greek shows this tendency only in minor points; in classical Latin, there is no trace of rill formation—on the contrary, *-s-* becomes *-r-* which is the direct opposite of such changes; but other Italic dialects, like Umbrian, exhibit the rill tendency from early times, and the Romance languages develop it completely; the purely Celtic languages show a predisposition in the same direction, and are justly considered the phonetic basis of at least certain Romance languages.

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[1] I use this rather awkward term in translation of Jespersen's *Rille*.

7. The Germanic languages do not take part in this development, but show a strictly contrary tendency—a tendency which was mentioned in connection with Latin: *Nowhere* in *purely Germanic* territory has a rill sound ever been developed from a slit sound or a stop. In two instances, rill sounds have even been changed to slit sounds: *s* became *r* under Verner's law, and *j* became the "narrow spirant" of North German and Scandinavian, with convex tongue surface, instead of the "wide spirant" pronounced with concave tongue surface, which we have in English and South-German. With respect to rill formation, Germanic is nearly identical with Indo-European, presenting a slight development on the original lines of the primitive language. Only two dialect groups of the Germanic branch show rill formation: Anglo-Frisian, in its palatalization, and South-German, in the development of dental sibilants in the second sound shifting. But it must not be forgotten that these two groups belong to formerly Celtic territory, where the continuance of Celtic phonetic tendencies can readily be understood.[1]

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[1] In this respect, it is interesting to note the discrepancy between actual English usage of the present day, and a somewhat artificial opposition to it, in the pronunciation of the suffix *-ture*. English linguistic tendency requires imperatively the pronunciation *-tʃər* or *tʃūr*; as early as 1810, Smart, in his Gr. of Engl. Pron., requires the former pronunciation; Ellis, Early English Pronunciation, 1162, remarks: "My own pronunciation *krīti̭ūr* is, as I fear, pedantically abnormal, although I habitually say so, and *krītšə, fənitšə* are the natural sounds." And in the Introduction to Walker's Pronouncing Dictionary, Smart says (1838):

"Let any English mouth fluently pronounce the phrase "*I'll meet you*" without accent or emphasis on *you*, and there will be heard, in the transition from the *t* in *meet*, to the *j* in *you*, a slight interposed sound of *sh*. So likewise in saying: "*Would you favor me?*" there will be heard, in the transition from the *d* in *would* to the *j* in *you*, an interposed sound of the vocal *sh* (ž in *pleasure*). It would indeed be possible to prevent the intrusion, but what the speaker would gain in accuracy by such care, he would lose in ease and fluency of transition. So likewise it is possible to preserve the pure sound

8. While in regard to rill formations the Germanic languages are conservative to the utmost, the opposite is true in regard to the changes of the *way* of articulation, in the meaning of the term defined in § 5. These changes are, on the whole, covered by the term "sound shifting". Changes from voiced to voiceless stops appear, to a minor extent, in Armenian, from voiced to voiceless spirants in Latin (similar *dh* > θ, *bh* > φ, *gh* > χ in Greek), from voiceless stops to slit spirants to a very limited extent in Iranian and Celtic. But only the Germanic languages exhibit a general principle of such a change, affecting all three classes mentioned. In this respect again, they stand isolated from all other Indo-European languages. Not as an explanation, but only as a description of this phenomenon, the following may be stated: The non-Germanic Indo-European languages show an inclination towards articulation at or near the hard palate, the Germanic languages avoid it. In consequence of this, palatalization in the narrower sense of the word—"mouillierung"—is of common occurrence in the former, but unknown in the latter. Rill formation frequently accompanies or follows palatalization, and presupposes similar phonetic conditions as this, namely a relatively great pliability of the tongue-surface; avoidance of palatalization, and of rill formation, on the other hand, point to a comparative rigidity of the tongue-surface in Germanic territory; this need not by any means be a physiological condition, but rather seems to develop in individuals through the linguistic tradition of their surroundings. The phonetic fact, nevertheless, remains.

9. Sound shifting is due to an increase in the force of expiration. This is an acknowledged fact which is almost self-evident. This increased force of expiration causes the development of voiceless stops to voiceless spirants, and of voiced aspirates to voiced spirants, by gradually overcoming the muscular tension of the tongue (or lips) and thus changing the occlusion into a narrowing; on the other hand, it causes opening of the glottis, i. e., voicelessness, (change of *b* to *p*, etc.) at a period when, by reaction, the muscular tension had increased. The details of

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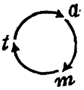
of the *t* and *d* in *nature* and *verdure*; yet nothing is more certain than that they are not preserved pure by the best and most careful speakers".

On the other hand, these *tš*, *dž* combinations (also in words like *just*) present difficulties to the native German or Scandinavian.—Engl. voiced *th* is pronounced *z* by Frenchmen, Italians, etc., but *d* by Germans and Scandinavians.

these changes are analysed from a physiological standpoint in my article "Forchhammers Akzenttheorie und die germanische Lautverschiebung", where also Verner's law, Sievers' law, Holtzmann's law, and the Germanic assimilation of *n* are explained on the same basis.

The two-fold nature of the Germanic sound shifting—increase of the strength of expiration, and of the muscular tension, balancing each other in a measure—has been aptly represented by Jacob Grimm in the form of his well-known circle:



While we can no longer accept this diagram as to details, it shows, on the whole, an ingenious insight into the character of this phonetic change.—It is a natural consequence of the facts here presented that the second sound shifting means, in part, a reversion to the Indo-European consonants; compare OHG. (Lex Sal.) *haupit* (and *haubit*): Lat. *caput*.

10. The second sound shifting presents peculiar problems from the standpoint of phonetic tendencies as outlined in the preceding paragraphs. Originally, it is clearly based on the same tendencies as the first sound shifting: tenuis becomes voiceless spirant, media becomes tenuis, voiceless spirant þ becomes voiced spirant *đ* and then *d*.

But: (a) these changes are non-exceptional and permanent only in the dental series, (b) instead of the spirant, we find in certain positions its phonetic predecessor. the affricate, which partly returns to the simple stop (*kh* > *k*), (c) the dental stops develop (gradually?) to rill sounds, originally with a comparatively flat, later with a sharp rill: *t* > *z̨z̨* > *ss*.

On the basis of § 7, the following hypothesis seems justified: The Germanic element of the present South German population belongs to the Suevian group which until the beginning of our era inhabited the center of Germania Magna. The second sound shifting, as a tendency, started before, or at the time of, their migration, being nothing but a continuation of the first sound-shifting. It was impeded, and partly deflected, through their intermingling with the Celts in South Germany: Celtic phonetic tendencies replaced the Germanic phonetic tendencies. The

Anglo-Frisian conditions were similar, except that in this group the Celtic influences are older, and were partly repeated.

11. These are only a very few illustrations of the phonetic tendencies in the Indo-European consonant system. The physiological or traditional explanation of the basic non-Germanic tendencies has been mentioned in § 8 : a relatively high pliability of the tongue. This is fact, not hypothesis. The cause or causes of the Germanic tendencies described above cannot be stated with such certainty. Rigidity of the tongue is a merely negative element which does not explain anything. Increased force of expiration is the underlying factor, but raises the question "Why?" even more vividly than the phonetic changes do themselves.

The question has been answered in various ways. Hans Meyer assumes effects of the mountainous habitation of the Germanic people (ZfdA. 45, 101 ff.), but his proof is not convincing; Wundt (Völkerpsychologie I^2. 208 ff.) supposes acceleration of speech, but has been refuted by Delbrück. Herzog (Streitfragen der roman. Phil. 66 ff.) approaches a phonetic explanation more than anyone else (although his explanation of Verner's law is obviously incorrect, being based on the untenable statement that a spirant belongs naturally to the preceding syllable: "Wo aber der vorhergehende Sonant nicht betont war, also die anschwellende Bewegung auch während der Einsatz (*sic*) des Spiranten, der ja zur vorhergehenden Silbe zu gehören pflegt, anhielt, assimilierte sich zunächst dieser an den Sonanten hezüglich des Stimmtons"). He assumes, "es sei zu einer gewissen Zeit statt des gleichmässigen Einsatzes des Druckes ein leicht anschwellender eingetreten, sodass also betonte Silben eine anschwellend-abschwellende Druckverteilung erhalten . . . . Die Druckverschiedenheit innerhalb der Silbe hätte sich nun immer mehr verstärkt, so dass dieselbe schliesslich äusserst schwach betont einsetzte". This theory cannot lead to correct results because it is based on the incorrect assumption that an accented syllable requires a stronger force of expiration than an unaccented one. But it contains the admission of the well-known fact that in Germanic languages a change of the character of accent has taken place, in such a way that a more or less musical accent was gradually replaced by a very decidedly dynamic accent. It is not my purpose to discuss in this paper the development and effects of this phonetic tendency. However, we can certainly assume that one common psychological or physiological cause must be at the bottom of both the Germanic accent and the Germanic sound shifting. It would be hard to imagine any physiological causes of such changes, but a psychological explanation seems more feasible. Would it be too wild a hypothesis to think of a Germanic tendency to direct the attention to the *thought*, instead of the *form* of speech? To concentrate, accordingly, the force of a sentence into one or few words, the momentum of a word into one important syllable? This would be entirely in accordance with the general development of Germanic languages, but it goes far beyond the scope of this paper, in fact, at present even beyond the limits of comparative phonology.

12. As said in the introduction, these are only suggestions, not detailed investigations. Much is to be done in this field: Phonetic sketches of individual languages, both from an historical and a strictly modern standpoint; detailed investigations of single groups of sounds; of the problems of the various vowel changes; of palatalization, especially in the Slavic and Romance languages; of assimilation, dissimilation and metathesis. Much has been done along these lines, but, as far as I am aware, from the standpoint of more or less isolated facts, not with reference to phonetic tendencies. The ethnic structure of nations, its relation to phonetic tendencies and the influence of economic, geographical, cultural conditions upon pronunciation present problems of the greatest interest and importance. In short: Comparative philology, with all its splendid achievements in the recognition of isolated facts has nearly arrived at the point of Mephisto-Faust:

> Dann hat er die Teile in seiner Hand,
> Fehlt leider nur das geistige Band.

In building this spiritual bridge, correlating the phenomena of language, I see the most fascinating task of Comparative Phonology—and in a more distant future, also of Comparative Morphology and Comparative Syntax.

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